

THE GENUS HELIANTHEMUM IN CALIFORNIA¹

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Helianthemum suffrutescens sp. nov. Frutex, 4–8 dm. altus erectus robustus foliosus, e basi virgate ramosus; cortex porphyreus; ramuli lignosi vel herbacei, ad basin tomentosi; folia 10–43 mm. longa, 2–8 mm. lata, lineari-lanceolata vel oblanceolata, planata, margine paullo revoluta, apice acuto obtusove; petioli breves vel obsolescentes; panicula bracteata; bracteae 2–25 mm. longae, inferioribus foliis simillimis; alabastris ovatis acuminatis; sepala pilis stellatis apicibus plerumque rubris dense sparseve pubescentia, exterioribus 2 mm. longis, 0.25 mm. latis, anguste linearibus, interioribus 4–5 mm. longis, 2–2.5 mm. latis, ovatis acutis; petala 6 mm. longa, 5–6 mm. lata, obovata, apice erosa; stamina 19–30; ovarium 3-loculatum; stylus 0.5 mm. longus, crassus; stigma capitatum trilobatum capsula loculicida, apice acuto; semina immatura trigona, manifeste scrobiculata granulata; funiculus longus curvatus.

Erect shrub 4–8 dm. high, robust, leafy, virgately branching from the base, distinctly woody, twigs woody or herbaceous with stellate tomentum which persists to the woody base; leaves linear lanceolate to oblanceolate, flat, slightly revolute on the margin, 10–43 mm. long, 2–8 mm. wide, acute or rounded at the apex, shortly petioled or almost sessile, densely stellate pubescent; flowers in leafy bracteate panicles, bracts 3–25 mm. long, the lower conspicuously foliaceous; buds ovate, acuminate; sepals densely to lightly stellate pubescent, hairs often tipped red, outer 2 mm. long, .25 mm. wide, narrowly linear, inner 4–5 mm. long, 2–2.5 mm. wide, ovate-acute; petals 6 mm. long, 5–6 mm. wide, obovate, erose at apex; stamens 19–30; ovary 3-celled; style short, 5 mm. long, stout; stigma capitate, 3-lobed; loculicidal capsule acute at apex; immature seeds 3-sided, appearing pitted or granular, attached to placenta by a long curving funiculus.

Type. AMADOR COUNTY: dry slope, 5.5 miles west-southwest of Bisbee Peak, elevation 500 feet, May 23, 1936, *Beryl Schreiber 2243*.

Other specimens examined. AMADOR COUNTY: Bisbee Peak, April 29, 1936, *G. T. Nordstrom 254*; Michigan Bar, Apr. 24, 1936, *G. T. Nordstrom 760*; Michigan Bar, May 23, 1936, *Beryl Schreiber 2244*; Michigan Bar, June 12, 1937, *Beryl Schreiber 2401*.

The type specimen and the additional collections are filed in the Vegetation Type Map Herbarium, California Forest and

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Range Experiment Station, located in the University of California Herbarium at Berkeley. Isotypes have been distributed to the United States Forest Service Herbarium and United States National Herbarium at Washington, D. C.; Gray Herbarium at Harvard; and the University of California Herbarium.

Helianthemum suffrutescens was abundant at the type locality, associated with *Adenostoma fasciculatum*, *Arctostaphylos manzanita*, *Quercus Douglasii*, *Lotus scoparius*, *Gnaphalium decurrens* var. *californicum* and species of grass. The area had been burned recently as indicated by the blackened stumps of *Adenostoma fasciculatum* and the heavy growth of *Gnaphalium decurrens* var. *californicum* and *Lotus scoparius*. In the Michigan Bar area the plants of *Helianthemum* appeared even more robustly suffrutescens than at the type locality. They occurred in scattered clumps associated with *Quercus Wislizenii* and grasses.

Helianthemum suffrutescens may be distinguished readily by its virgate habit, woody stems and abundant very gray foliage from the green rush-like *H. scoparium* Nutt. var. *vulgare* Jepson of the Sierra foothills, Coast Ranges and southern California. The leaves of *H. scoparium* var. *vulgare* are usually linear or occasionally wider, revolute and green, slightly pubescent to glabrate, and usually deciduous in early summer, a peculiarity which gives the plant a slender broom-like appearance.

The seeds of *Helianthemum suffrutescens* are apparently fire resistant. Many of the species of other genera in the type locality had been completely killed by fire, whereas *H. suffrutescens* had reseeded itself and mature shrubs were common. In the Michigan Bar area the year following a fire, the seedlings were innumerable and were the dominant plants in the locality. In the same area the year previous the individuals could have been counted. Therefore it is suggested that fire encourages the spread of this species which becomes a dominant part of a fire type vegetation in both the Bisbee Peak and Michigan Bar localities.

Helianthemum suffrutescens is densely leafy throughout its life cycle and observations made at different seasons over a period of two years failed to reveal the plants in a leafless condition. Collections of the seedlings were made in the Michigan Bar locality. These young plants had the same virgate habit as the mature shrub, and were extremely leafy, many of the leaves being oblanceolate and very pubescent but somewhat greener than in the older plants. The seedlings of *H. scoparium* var. *vulgare* are very narrow leaved and much greener in appearance.

The flower panicles in the *Helianthemum suffrutescens* are always leafy bracted while, according to most authors, those of *H. scoparium* var. *vulgare* are not. However, close scrutiny of many plants of this variety reveals the fact that the character of the naked as opposed to the leafy inflorescence does not hold,

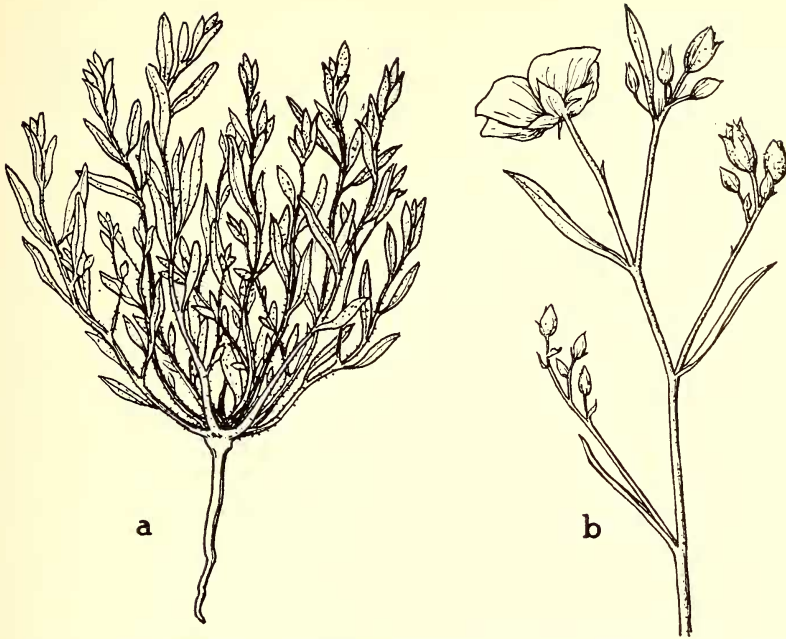


FIG. 1. *Helianthemum suffrutescens* Schreiber: a, seedling, $\times \frac{1}{2}$; b, inflorescence, $\times \frac{1}{2}$.

although the inflorescence is never so leafy as that of *H. scoparium*. Careful examination discloses no important differences in the flowers or the immature seeds of the two Sierran plants.

Typical *Helianthemum scoparium* is apparently restricted to the immediate coastline of California, occasionally extending inland where coastal influences are prevalent. *Helianthemum suffrutescens* is, therefore, geographically separated from this coastal plant. The coastal species is low, usually more or less divaricate in habit, the ultimate twigs erect, specimens from the type locality at Pacific Grove, Monterey County, appearing more or less twisted or matted. It is definitely green in appearance and slightly pubescent to glabrate, its leaves narrowly linear and often so revolute as to appear terete; almost wholly deciduous in the fall. The flower buds are relatively large and subtended by foliaceous bracts which often exceed the buds. The flowers are fewer than in *H. scoparium* var. *vulgare* or in *H. suffrutescens*.

Helianthemum scoparium var. *Aldersonii* Munz also is geographically separated from *H. suffrutescens*. It is found in the interior southern California mountains from the San Bernardino Mountains south to San Diego County. The characters which separate this variety from *H. scoparium* and *H. scoparium* var. *vulgare* as well as from *H. suffrutescens* are the extremely large and open panicle and larger sepals and petals. However, some of the ma-

terial of *H. scoparium* var. *vulgare* observed in Amador County has quite open panicles and rather large sepals, although the petal measurements were smaller. It would seem that there might be a relationship between the Sierran plant and the southern Californian plant. However, further field study on the southern California entity is necessary.

The third Californian species, *Helianthemum Greenei* Rob., is insular in distribution and differs widely from all the mainland species. The flowers are corymbose instead of paniculate and the calyx is densely glandular-pubescent. The foliage, however, closely approaches that of *H. suffrutescens* in aspect, although it is somewhat more grayish-pubescent.

The following key summarizes the differences between the California species and varieties of *Helianthemum*.

Flowers paniculate; calyx non-glandular.

Leaves narrowly linear; green, sparsely stellate pubescent to glabrous, deciduous in summer.

Low and divaricate; matted, with ultimate twigs erect, flowers few; inflorescence usually very leafy

H. scoparium

Tall and rush-like; flowers numerous; inflorescence sparsely leafy.

Panicle usually narrow; petals approximately 4-6 mm. long

H. scoparium
var. *vulgare*

Panicle extremely open, petals 8-12 mm. long . . .

H. scoparium
var. *Aldersonii*

Leaves linear-lanceolate to frequently oblanceolate, densely stellate pubescent; not deciduous in summer

H. suffrutescens

Flowers corymbose; calyx glandular; Santa Cruz Island . . .

H. Greenei

Many authors place the new world species of *Helianthemum* in the genus *Crocanthemum*. It seems, however, that the characters used as a basis for this separation are inadequate. *Crocanthemum* was first proposed by Spach (3) in 1836. At a later date he (4) distinguished it from *Helianthemum* by its alternate leaves, lack of stipules, straight peduncles, linear cotyledons and new world distribution. Spach mentions that *Crocanthemum* often has the lower leaves opposite and occasionally plants of *Helianthemum* have ascending peduncles both of which are exceptions to the characteristics of these genera as differentiated by him.

Janchen (1) separates the two genera on the basis of the old world species having opposite, 3-nerved leaves, and the cotyledons being linear-filiform and sessile, while the new world species have alternate, pinnately nerved leaves, and cotyledons united at the base. However, as has been pointed out by Spach (4), the lower leaves of *Crocanthemum* are sometimes opposite and the leaves in *Helianthemum* are pinnately nerved and not 3-nerved.

As to the cotyledons Spach (4) describes those of *Helianthemum* as being elliptic or elliptic-orbicular, whereas, in *Crocanthe-*

um they are linear. In Janchen's paper (1) the cotyledons were described as linear in *Helianthemum*, and, later, in an emended description of the genus in Engler's Pflanzenfamilien (2) he states that the cotyledons are long-elliptic. Apparently from these descriptions the difference in shape of the cotyledons would seem to be well marked. However, cotyledons of many seedlings of *Helianthemum suffrutescens* were examined in the field and it was found that they varied in shape from linear to elliptic or occasionally wider. Some of the cotyledons were united at the base and others were not. These facts indicate that in this group the shape and character of the cotyledons are not satisfactory criteria for separating genera.

The absence of stipules was formerly considered both by Spach (4) and Janchen (1) as important in the generic segregation of *Crocanthemum*. Later, a species from the Gulf States, *C. stipulatum*, was described by Janchen and this character lost its significance in the separation of old and new world groups.

Further study may reveal well defined differences between *Helianthemum* and *Crocanthemum* but for the present the new world species are referred to the genus *Helianthemum*.

November 22, 1938.

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A NEW SPECIES OF CIRSIUM FROM CALIFORNIA

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Cirsium campylon sp. nov.

Herba perennis, erecta, crassa, pallido-viridis, hydrophila, 6-21 dm. alta; e caudice caules vulgo solitarii, lanati vel arachnoidei, indumento tarde deciduo, sparse glanduloso-papillati; folia lanceolata, subtus albo-lanata supra glabrescentia; laminae pinnatifidae, sinibus rotundis, segmentis irregulariter 3-4-lobatis, lobis saepe quam longis latioribus, in aculeis crassis, stramineis 5-15 mm. longis terminatis; folia basalia 60-70 cm. longa; folia caulina superiora 20-40 cm. longa; capitula cernua, 2.5-3 cm. alta; involucri bractae anguste ovatae, valde recurvatae, coriaceae, 20-30 cm. longae, subter medium latissimae, ad mediis marginibus undulatae crosulatae, attenuatae, sulcatae, aculeo crasso 3-5 mm. longo terminatae; corolla alba, 18-22 mm. longa; microspora 31-33 μ diametro; styli rami 4-6 mm. longi.

Erect, coarse, pale green, hydrophilous perennial, 6-21 dm.